Summary

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# Exam – First Part

* Complexities
  + DFS/BFS =
    - Also called in exams “Graph connectivity”
  + Minimum Spanning Tree (MST)
    - Prim’s algorithm =
      * Prim with heaps =
    - Kruskal’s algorithm =
      * Kruskal with Union-Find = = best algorithm
  + Single-source shortest paths (SSSP)
    - Dijkstra’s algorithm =
      * Dijkstra with heaps= = best algorithm
    - Bellman-Ford’s algorithm =
  + All-pairs shortest paths (APSP)
    - Bellman-Ford with dynamic programming =
    - Floyd-Warshall =
  + Maximum flow
    - Ford-Fulkerson =
* NP-Hard problems
  + TSP – Traveling Salesperson Problem
  + Metric TSP
  + Maximum Independent Set (or Maximum independent set)
  + Vertex cover (or Minimum Vertex Cover)
  + 3SAT
  + Hamiltonian circuit
  + Clique (or Maximum Clique)
  + Set Cover

# Exam – Second Part

## How to do reductions

* Create the decision version of a problem
  + Input (common input for both problems)
  + Output (create an output describing )
* Given an instance of , we construct an instance of
* To show the reduction is correct
  + If we start from problem , then we can describe problem
  + If we used problem , we used problem